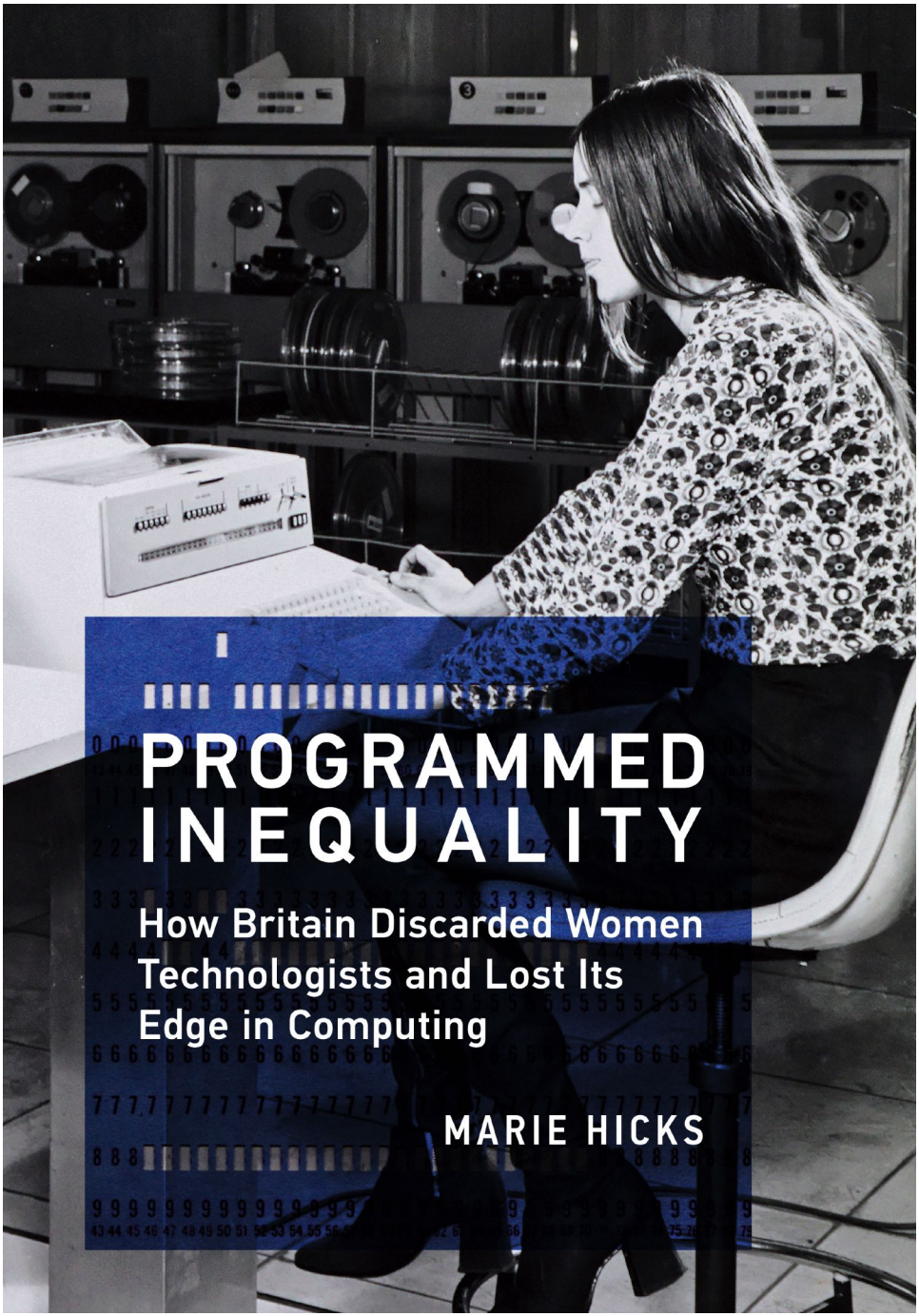
PROGRAMMED INEQUALITY
How Britain Discarded Women Technologists and Lost Its Edge in Computing
MARIE HICKS

intention of defining a new system for doing work that had not previously existed. As a result, it brought new workers into the Ministry, workers whose jobs relied on electronic computing. A similar process was taking place throughout the government as other departments found they needed to turn to computing to redefine, rather than simply speed up, their short- and long-term operations. By the middle of the decade, computer staff in government was growing at a rate of 30 percent each year and this showed no signs of slowing. A significant number of computing projects were delayed or left incomplete due to the government being unable to recruit computing staff in large enough numbers.[37]

In 1965, six hundred computers operated throughout the country, with four hundred more on order from computer manufacturers. Nearly every British citizen now relied on computers and computer workers to provide some crucial service or state benefit. The national government led the way in computer purchasing, spending £14.1 million just on computing hardware for sixty-two installations from 1958 through early 1965, and more than half a million additional pounds were spent buying time on other computing installations each year.[38] In 1965 alone, Western Europe as a whole spent £250 million on computers.[39] British government studies projected that the need for over three hundred thousand office jobs, or roughly 9 percent of the clerical workforce, would be obviated by computer installations before 1975.[40] At the same time, computer labor was in high demand, and computing staff were being hired in ever-greater numbers. That computing would increasingly define the future of labor was becoming clear—but what that labor would look like was obscured by layers of media representation.

Envisioning a Future of Low Labor Costs

A poem reprinted in a 1960 issue of an office machinery and management magazine conveyed the faith most computer purchasers placed in their new mainframes:

In the spring, young men (grown vague and lazy)
And girls (grown starry-eyed and hazy)
Being human
Lack acumen
How undistracted, single-minded,
Never mooning, never blinded,
The computer,
Being neuter.[41]

The "neuter computer" contrasted sharply with the gendered bodies of workers—particularly women workers. The clerical workforce of both the public and private sectors was heavily feminized by the 1960s and was becoming more so. Of the almost 7.8 million working women in Britain in 1961, nearly 2.7 million were clerical workers. This number did not even include office machine operators, who were often counted under a separate census designation; adding them in raised the number of clerical workers by close to a million.[42] For the most part, early computer operators were drawn from this pool of pseudoclerical labor.

However, highlighting workers' gender could be a potent selling point. Powers-Samas, which combined with British Tabulating Machines in 1959 to create ICT, consolidated the trope of the "Powers Girl" early on, a figure who demonstrated their electromechanical machines in advertisements and brochures. When the machines became electronic, the Powers Girls remained and served much the same function as before. Dressed in ladies' business attire, the Powers Girls showed how it might look to use a computer, humanizing opaque, intimidating, and potentially confusing machines. They also served a didactic function by showing the kind of worker that should operate Powers machines once a company purchased them. Finally, they showed purchasers that computers would not require a huge outlay for labor in addition to the hardware: "The conventional method is to hire women trained to operate any of the many machines available on the market," wrote one author when discussing the economics of purchasing a new electronic Powers machine.[43]

"Most 'operative' jobs," wrote *Office Methods and Machines* magazine, "are performed by female staff, and this group is absorbing the majority of the present 40 percent of girl school-leavers entering office work."[44] In other words, close to half of all young women leaving school went to work in offices by 1967, and of these, most went into computer operation work. This was key to selling machines, because from 1950 to 1966 wages and salaries in the aggregate had nearly tripled, but gross trading profits of companies had little more than doubled.[45] Women continued to be seen as the best financial bet for much computing work.

In industry, untouched by any equal pay legislation until 1975, the discussion of the benefits that discriminatory wages produced was often quite candid. In 1965, the chief accountant of Bibby and Baron Ltd., the largest paper bag manufacturer in England, wrote a series of articles on how office managers could wring the greatest efficiency from their workers at the lowest cost. He urged employers to hire women, saying: "Equal pay for male and female workers is unlikely to be accepted by industrial concerns ... [and] because female clerks can be obtained at a cheaper price

than males, and may be just as good if given the same opportunities and training, it should be your policy to employ them wherever possible."[46]

Throughout the 1960s, British computing companies' advertisements were dominated by figures similar to the Powers Girls, who became the object of a specific kind of managerial "male gaze." Nearly all photographs used to sell and showcase computers in the early 1960s pictured a conservatively dressed, plain-looking female workforce standing or sitting while working at machines.[47] As most machines became electronic, however, subtle changes in advertising style crept in. In earlier ads, Powers Girls smiled and engaged the viewer. By the late 1950s and early 1960s, often the Powers Girls only presented their backs to the viewer. Workers became increasingly faceless and expressionless as companies marketed more expensive machines. In the advertisement shown in figure 3.2, the woman's figure does not even have a face drawn on it.

Figure 3.2
The attraction of a computer meant the continued promise of low-cost, interchangeable labor. Powers-Samas advertisement in *Office Magazine*, May 1958.

Figure 3.3
English Electric–LEO advertising brochure, 1963.

English Electric–LEO—one of the leading British computing companies of the sixties, created from a merger of LEO Computers and English Electric's computing division in 1963—ran with this trope in its ads. The cover of its 1963 brochure featured a woman who could easily be mistaken for a Powers Girl, facing away from the camera and not engaging the viewer. The other major British computer company of the era that produced machines geared for business and administrative automation, ICT, produced similar marketing materials.

Images from a 1963 ICT magazine and 1962 advertising brochure were populated with numerous, anonymous women workers who provided

Figure 3.4
ICT Magazine photograph, 1963.

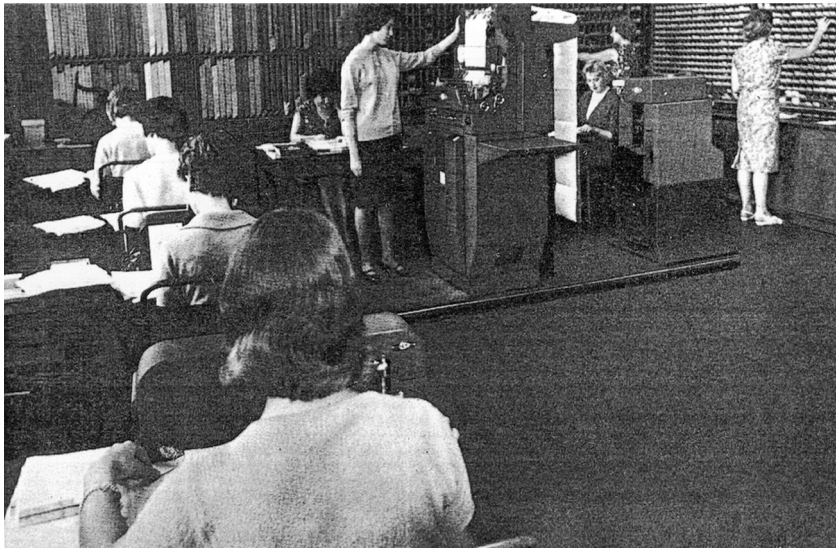

Figure 3.5
ICT advertising brochure photo, 1962.

little visual interest and failed to engage the viewer.[48] Far from being positioned as "cheesecake" to help attract attention to the machines, the women workers were used simply as placeholders for the company's own staff. ICT's advertising brochure has page after page of photographs of workers' backs, taken in the machine rooms of companies that had already "signed on to progress" and installed ICT computers.[49] As the electronic age wore on, gendered bodies were sometimes used less to humanize computers than to show how people should accommodate themselves to machines.

Despite the orderly machine rooms, the effect of viewing an entire brochure containing page after page of similar photographs of silent, oblivious, women workers did not make computing seem like it would alleviate drudgery, as promised by advertising rhetoric. Through these photographs, drudgery became emphasized, taken for granted as part of a high-performance system engineered to maximize throughput. Human labor was positioned as a temporary inconvenience within systems that anticipated a more fully automated future. If labor could not be made fully invisible, at least it could be made less obtrusive by using temporary, high-turnover women workers with no claim to equal wages, job training, or promotion opportunities. The need for more specialized computer staff required a concomitant increase in training, but "in practice this really means training for male office staff only," noted *Office Methods and Machines*. That group would soon comprise a new and growing "administrative" class of computing professionals, requiring "education in complex techniques and business practices as well as a wide knowledge of the overall activities of the employing company." By contrast, the "operative" group within office staffs generally only received "training mainly in the manual skills needed to work individual office machines" plus whatever on-the-job skills they could pick up.[50]

Powers-Samas, and later ICT, marketed its computing solutions worldwide, focusing especially on Commonwealth and former colonial markets. Just as the machines in the company's advertisements had impact beyond the British context, so too did the images of workers in these ads. As British companies raced to export computers to compete with IBM, overseas markets for British computers were also targeted with information about who should fill computing jobs. Cultural and economic ideals exported along with machines meant that technological transfer was as much about the transfer of labor patterns as it was about the transfer of specific technologies. As early as 1955, Powers-Samas opened a service

year after the CCA's creation, the responsibility for telecommunication in government was also added to its sprawling mandate.

The Civil Service Department now consolidated all authority for computer procurement in the CCA in order to decrease "the independent computer strength of the big departments ... at a time when the development of computers was likely to have implications for the Machinery of Government."[40] The CCA was tasked with reviving the program of centralized, technocratic control that had failed under both the Treasury and its own parent department. The constraints of computer procurement placed on departments by the CCA were inefficient and "by no means always palatable to major users," complained HMSO, adding that CCA rules also led to "the loss of technical 'edge'" in departments performing advanced computing due to the slowness and the strictures that "central policies imposed."[41]

To avoid lower-level workers gaining power over, and through, new technology, successive governments positioned computers as tools for those high up in the administrative hierarchy: men who could be trusted to represent the interests of the state and preserve its status quo. As labor became increasingly restive in the 1970s, the government clung to policies that centralized power and kept technology out of workers' hands. As miners' strikes disrupted the electricity supply, it became ever more clear that health of the economy relied on the control of technological systems. Trying to maintain control through consolidating powerful technology in the hands of a few was a doubled-edged sword, however.

Securing the Machinery of Government against Computer Workers

In the early 1970s, the CCA reported: "So far industrial action by civil servants has only had limited impact upon the government's computer-based operations." Yet it also warned that the government could not "assume that the consequences of any future disputes will be so easily overcome. The Staff Associations have had an opportunity to gauge the strength of the weapon in their hands ... and will undoubtedly have learned something from recent experience about how most effectively and quickly they can disrupt departmental data processing at minimum cost to themselves by determined action on the part of a few key staff inside or outside the computer installation."[42]

The Labour party's inability to gain control over organized labor and reduce the growing number of strikes had helped destroy Wilson's chances in the 1970 general election. His secretary of employment and

productivity, Barbara Castle, responded to the labor union crisis with an exceedingly unpopular government white paper called *In Place of Strife*, which proposed curbing the right of unions to strike.[43] Under Heath, Wilson's utopian vision of technology as a power for social equality all but evaporated. Heath's less than four years as prime minister were wracked by major dockworkers' and miners' strikes. He declared states of emergency every year he was in power.[44] By this point, computing had matured into an important tool for control, and a system just as essential to the working of the state as electricity or transport. During this time, concerns about controlling potentially restive labor redefined the way the government used technology. Ensuring that nonmanagement computer operators and programmers—many of whom were women with little reason *not* to engage in labor action—could not wreak havoc became another compelling rationale for centralization that afforded tighter control by management.

This change, long in coming, was now the government's single focus when it came to computer organization. Throughout the 1960s, the Treasury had kept an eye on every computer installed in government and their application to various projects. By the early 1970s, it had ceased keeping track of each machine, focusing instead on the sixty most important data-processing installations. As the CCA took over this role, the nature of oversight changed, and concern about the security of computer systems reached a fever pitch.

In a secret document, a multidepartment study group headed by the CCA outlined how these systems that were handling the "work most vital to government administration" had to be protected against any potential threats posed by dissatisfied workers. The CCA's safety measures called for further centralization of government computing and its management, uncannily echoing a version of an Orwellian state.[45] Its aims were overly ambitious: The CCA aimed to create a centrally organized state computing apparatus that would allow, "in the future, the government as a major computer user [to] be able to speak more clearly with a single central voice."[46] Because "administrators [had] come to depend on computers not only as permanent replacements for large numbers of clerks, but as tools ... to improve the foundations of policy decisions," the CCA created a government-wide subcategory for "highly professional" computer workers within the executive class.[47] This was a last-ditch effort to bring into being the specialized cadre of technocrats upon whom government computing projects could rely.[48]

Even while the CCA continued the process already underway of trying to get management into computer jobs, it turned to a more explicit program of grooming this cadre of ultra-high-level technocrats. As "major government functions become more dependent in ADP, the importance of this small proportion of staff will increase," CCA management reasoned.[49] The days when it was possible for computing staff to simply be workers with technical skills were coming to an end. This program of action continued down the path of masculinizing computing work, fully institutionalized a predominantly male programmer–manager class, and paved a rocky path with organized labor. Government administrators' fears of labor disruptions and their pessimistic view of rank-and-file computer workers further limited training and promotion opportunities for nonexecutive computer workers through the 1970s. With usually no more than A-level qualifications, these budding technocrats were trained to work with computers on the assumption that they would eventually rise to the highest levels of administration in government or industry. These young men "who should be candidates for the highest posts in the Service" were meant to construct a new era of scientific management and technocracy, helping govern the nation by gaining control of the increasingly data-drowned British state.[50]

The head of the CCA outlined to Parliament how his plan would succeed where the Treasury's previous regime of centralized control had failed, focusing on how his agency would "offer greater scope for increased professionalism and for computer careers in government" while sweeping away older models of organization.[51] The CCA's plan would further professionalize computing out of organized labor's reach. However, the desire for strict central control offered great danger as well as great power. Key computing installations in the Civil Service, Post Office, and nationalized industries became ideal targets for the increasingly disgruntled British labor force precisely because they were so centralized.

As nationwide labor unrest in response to wage restraints threatened the government's control over the economy, maintaining the security of computing systems became a pressing concern. Pay freezes for public sector workers added to the burden caused by other austerity measures. In 1973, machine operators and data-preparation staff at several government computer installations went on strike several times, for up to two weeks at a time, to maximize disruption. This prompted a major reevaluation of the security of the government's computing installations.[52] In a secret, numbered-copy report whose circulation was tightly controlled, the CCA drew up a master list of the most vital computer centers in

government and compiled a file of industrial actions in computing installations and their effects. The report offered an exhaustive list of proposed solutions to head off future disruptions and carefully evaluated the pros and cons of each.[53]

On the list of the most critical computing installations, surprisingly few were in the realm of defense. Defense applications were of little immediate worry for the CCA, because it concerned itself almost exclusively with the government's huge administrative computing systems. Payroll, social security, and the payment of pension or unemployment benefits formed the most important work of the state's large computing installations, followed closely by stock control, savings bank accounts, VAT and PAYE calculations, tax collection, and driver licensing. In all of these cases, no manual fallback was possible. So-called pink-collar women's labor determined the functioning of large parts of the British public sector and economy, directly impacting national stability.

It would be easy, the CCA noted, to sabotage a full day's work by "switching labels" on output disks and scratch disks, or to cause "damage to sensitive magnetic components and to easily accessible parts of the central processing unit or ancillary equipment." Although this behavior was not expected of executive-level civil servants, they were not yet the majority of computer workers. In some cases, even a simple "disregard of operating instructions" could be enough to severely disrupt work while remaining under the radar as a deliberate action.[54]

Keeping these informational systems running was so important that the CCA explicitly stated security concerns were now "an important factor in determining the appropriate form of computing for particular operations." The use of "cheap, small computers and intelligent terminals," they reasoned, "could make it possible to process information" without resorting to using a large, central computer installation. "This has obvious advantages," CCA officials reported, "in that it disperses and reduces the target for many forms of physical attack." In addition, "it would also help to reduce the impact of industrial action—which would have to be mounted and sustained on a much larger scale than would be necessary to achieve maximum disruption at a central installation."[55]

The ease with which systems could be sabotaged without unions even taking official strike action alarmed the CCA so much that it considered laying off government computer staff and replacing them with contract workers from computer companies. Had this work been privatized, ICL may have gotten a significant share, but a more likely beneficiary at this point in time would have been IBM UK. By 1973, IBM's larger

Figure 5.1
ICL advertising played on fears about unruly staff and work slowdowns, offering more automated services as a technological fix for these problems. It is little coincidence that two women are in the foreground; women increasingly represented a threat to employers as their labor force participation and union strength grew. *ICL News*, February 1970.

staff was better equipped to deal with such an influx of work. Of equal importance was the fact that no part of IBM's staff was unionized or likely to unionize. IBM UK's leaders were proudly antiunion and took aggressive measures to ensure that their offices did not unionize, despite significant employee pressure. From 1975 through 1977, both professional and manual employees at IBM UK tried to use the 1975 Employee Protection Act to organize, but IBM UK fought their attempts bitterly, spending thousands of pounds on internal and external public relations campaigns that painted trade unionists as outsiders and troublemakers. Unions, IBM management warned, would ruin the current system of corporate paternalism and merit pay. Internal memoranda warned managers and workers alike about its dangers, intimating that the company would take a highly adversarial stance if workers organized. In 1977, faced with a ballot on unionization, IBM UK workers voted down the measure by an overwhelming margin.[56]

Because IBM workers were encouraged to see themselves as part of a professional class more aligned with management than organized labor, they fit perfectly into the government's technocratic vision. Even IBM's lower-level workers were more like the government's ideal technologists than midlevel civil servants engaged in computer work. IBM employees were safer and easier to control from the government's perspective. Even those who did not identify as "professional" often shared the ideals of management, as in the case of one self-described "working-class, nonmanagement" IBM staff member who wrote a letter to the editor of the local newspaper proclaiming his distaste for unions. In a testament to the reach of IBM's union disinformation campaign, the letter writer felt the need to assert that he was not a "paid, professional letter-writer" writing on behalf of the company.[57]

Although privatization of government computing might have offered more security, the government did not outsource its computing to IBM UK or ICL in any large measure in the mid-1970s. The Treasury and Civil Service Department needed to keep computing in house for maximal control. Treasury leaders recognized the need to carefully maintain good relations with the government's increasingly important technical staff, "but [they had] to find more of the *right people* to meet immediate needs and those who, in a decade or so ahead, [would] be the senior administrators in a highly technological environment" (italics mine).[58] Dealing with the demands of nonmanagement computer workers was a temporary stopgap measure on the way to an all-managerial class of computer professionals.[59] The CCA kept a service-wide register of management-level ADP staff and encouraged them to take time off for more computer training courses, fully paid for by the government.[60]

Nonetheless, the danger of potential strike action encouraged several government departments to consider changing the centralized nature of their computing systems. The Department of National Savings, for instance, feared the effects of even a limited puncher or operator strike, because if its main accounting computer were taken down for any period, it would "bring the business of the National Savings Bank virtually to a complete standstill," during which "updating of all computerized accounts and manual accounts would be impossible."[61] Customer inconvenience would be only a small part of the problem. A failure like this would also hugely increase the risk of fraud and overdrafts. The bank's other, smaller computer installation processed fortnightly dividends for British savings bonds and so could not take on the work of the main computer. There was no redundancy in the system. A strike at either of the

bank's two computer installations would have had the effect of halting business and potentially losing the public's trust. Even a relatively minor strike action involving no more than one hundred unionized computer staff at the bank "would be little short of disastrous."[62] No longer was a centralized system a virtue.

These fears were well-founded: Computer strikes became a significant problem in the 1970s—and a powerful weapon for organized labor. In March 1973, a series of selective one-day strikes by the Civil and Public Services Association (CPSA) and Society of Civil Servants closed down a whopping twenty-six computer centers, including several listed as highest priority, and significantly disrupted nine others.[63] Many of these striking computer workers were women—and their proximity to complex machinery gave them power disproportionate to their status. Of several thousand striking workers in the Department of Health and Social Security and the Employment Department, a small cohort of computer workers like these was described by the *Times* as causing the worst trouble: "The union's most damaging strike is that of 25 computer operators at Southend who are working on registration for value-added tax. This strike is in its second week and the work is much behind schedule."[64]

Even worse than the initial, brief strikes were the labor slowdowns and instances of passive resistance that followed. Computer workers at several dozen installations refused to perform mandatory overtime and other work that was not explicitly spelled out in their job responsibilities, adopting a "work to rule" approach in the absence of an official strike. Both mandatory overtime and the removal of overtime opportunities were major points of contention for computer workers, highlighting the fact that they were still largely wage earners rather than professionals.[65] The shift labor patterns of computer operation in fact made it more attractive for women workers with family responsibilities, so attempts to undo this were especially resented.

Slowdowns significantly hindered throughput at each computing installation, causing several projects to miss their target dates, and created a snowball effect that made new projects impossible. Secondary and tertiary projects that relied on these targets were slowed or scrapped, and new top-priority projects that required these bottlenecked computer installations were forced to be rescheduled. Most seriously, the CPSA organized strikes of feminized punching staff for periods of seven days or more. The skills of the lowest-level workers in the data-processing chain appeared formidably important once removed. Ten installations were inconvenienced by a delay of their work, among them the Department

of National Savings. But the VAT computer center was critically affected, and the implementation of the new VAT system was not completed on time as a result, impeding the government's ability to collect a major tax revenue.

In some cases, departments were able to use the extended downtime to perform essential systems maintenance. Still, prolonged walkouts heightened fear of what was to come in an era in which low-level, feminized workers like punchers could alter the course of the highest-level government projects and programs.[66] Every hour that computing power was not maximized, the nation lost money. The changes to shift work and overtime schedules that had in part provoked this industrial action were themselves an attempt to keep expensive machines running constantly. Even just worker slowdowns at these sites cost the Treasury tens of thousands of pounds each day. From computers to industrial sewing machines, women trade unionists struggled to change the perception of their work with machines industry-wide, trying to convince management their roles were skilled and important by asserting their power through strike action.

The effectiveness with which workers shut down so many computing installations by withdrawing relatively small numbers of staff spooked government officials and pointed to potentially dire problems going forward if huge centralized systems remained the organizational model. Worrisome too was the fact that a clerical union, the CPSA, was cooperating with unionized workers in higher levels of the service. As workers in different levels of the service joined together to make their displeasure felt, the CCA's agenda to install technocrats in place of all technicians became ever more urgent.

Gender as Class

In computer worker strikes, the delineation of a large proportion of workers from managers was one of both class and gender.[67] In this context, gender becomes illegible in the archives—and women literally disappear from the historical record—without an understanding of the class system that defined women's and men's work. Gender, after all, is a classed category as much as class is a gendered category: Women occupy fundamentally different social levels than even their nearest male peers simply by virtue of being women. As the Conservatives tried to corral labor into compliance with wage and price controls to dampen inflation, the rift between the state and the women workers who made it run grew larger.